

U.S. Application No. 10/036,338
Amendment dated January 23, 2004
Reply to Office Action dated August 26, 2003

REMARKS/ARGUMENTS

Reconsideration and continued examination of this application are respectfully requested.

In the amendment, non-elected claims 1-39 and 59 have been cancelled. The applicants reserve the right to file one or more divisional applications to pursue this non-elected subject matter. Furthermore, claim 40 has been cancelled as well. Claim 41 has now been amended to become an independent claim. Furthermore, claim 49 has been amended to become dependent on claim 41. New claims 60-62 have been added by way of this amendment. Support for the amendments and new claims can be found throughout the present application as originally filed including, but not limited to, pages 5, 15, and 16 of the present application. Accordingly, no questions of new matter should arise and entry of this amendment is respectfully requested. By way of this amendment, claims 41-58 and 60-62 are pending.

At page 2 of the Office Action, the Examiner sets forth the reasons for the restriction requirement. The applicants affirm the election of claims 40-58. As indicated above, the applicants reserve the right to pursue the non-elected subject matter by one or more divisional applications.

At page 3 of the Office Action, the Examiner rejects claims 40-58 under 35 U.S.C. §112, second paragraph. The Examiner asserts that claims 40 and 49 are indefinite. In particular, the Examiner asserts that claim 40 is indefinite since a claim, according to the Examiner, cannot be both a product and a process claim. The Examiner further asserts that claim 49 is indefinite because it is unclear what "HCM" indicates. For the following reasons, this rejection is respectfully traversed.

U.S. Application No. 10/036,338
Amendment dated January 23, 2004
Reply to Office Action dated August 26, 2003

Claim 40 has been cancelled and therefore the rejection of this claim is moot. For the record, claim 40 was a product by process claim and therefore totally appropriate under U.S. patent laws. Furthermore, claim 49 no longer recites HCM. Accordingly, this rejection is moot. For the record, HCM is a common abbreviation which stands for hollow cathode magnetron as indicated at page 2, line 21 of the present application.

At page 4 of the Office Action, the Examiner rejects claim 40 under 35 U.S.C. §102(e) as being anticipated by Liu (U.S. Patent No. 5,993,621). The Examiner asserts that Liu shows a sputtering target made of titanium and further shows processing steps which include mechanical deformation and annealing. The Examiner further indicates that cold rolling is preferred in Liu and that various thickness reductions of a starting high purity titanium billet are shown. The Examiner further asserts that reducing grain sizes to 5 microns or smaller is shown in Liu as well as other processing steps. For the following reasons, this rejection is respectfully traversed.

Claim 40 is no longer pending. Accordingly, this rejection should be withdrawn.

At page 6 of the Office Action, the Examiner rejects claims 40 and 41 under 35 U.S.C. §103(a) as being unpatentable over Liu in view of Kulkarni et al. (U.S. Patent No. 6,283,357). The Examiner relies on Liu in the same manner as above in the earlier rejection. The Examiner does acknowledge that Liu does not show the formation of a hollow cathode target. The Examiner then relies on Kulkarni et al. and asserts that this reference shows a clad HCM sputter target having a light weight and/or inexpensive low purity cladding material bonded to a plate of sputter target material. The Examiner further asserts that the sputter target shown in Kulkarni et al. is a high purity material which can include tantalum and niobium as well as other metals. The Examiner further

U.S. Application No. 10/036,338
Amendment dated January 23, 2004
Reply to Office Action dated August 26, 2003

asserts that Kulkarni et al. shows various metal working steps. Thus, the Examiner concludes that it would be obvious to one of ordinary skill in the art to modify Liu by attaching the target to an outer shell of a non-sputtering material to form hollow targets as shown by Kulkarni et al. For the following reasons, this rejection is respectfully traversed.

Claim 41 of the present application relates to a sputtering target assembly which comprises a sputtering target having sidewalls and further comprising a top portion made of a non-sputtering or sputter resistant material. This top portion is attached to the sidewalls of the sputtering target to form a hollow cathode target. Thus, the top portion and the sidewalls are part of the sputtering target and are exposed to the sputtering process wherein the sidewalls will sputter during the sputtering process but the top portion will be sputter resistant or non-sputtering.

Unlike the claimed invention, as admitted by the Examiner, Liu does not at all relate to a hollow cathode target design at all and therefore certainly shows no top portion made of a non-sputtering or sputter resistant material and sidewalls made of a sputtering material. Furthermore, Kulkarni et al., while showing a hollow cathode target design, only describes a sputter target made of the same material on the sidewalls and the top portion. To avoid confusion, the top portion of the sputter target would be the surface opposite numeral 20 in Kulkarni et al. as shown in Figure 3. Furthermore, the top portion would be, for instance, the inner surface of numeral 15 as shown in Figure 2 of the present application. Clearly, Kulkarni et al., as indicated in the description of Kulkarni et al., makes the entire sputter target material of the same material since it is made from the same plate. Accordingly, for these reasons, even a combination of Liu with Kulkarni et

U.S. Application No. 10/036,338
Amendment dated January 23, 2004
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al. does not teach or suggest the claimed invention, and therefore, the rejection should be withdrawn.

At the bottom of page 10 of the Office Action, the Examiner then rejects claims 40-48 under 35 U.S.C. §103(a) as being unpatentable over Kulkarni et al. in view of Wright et al., "Effect of Annealing Temperature on the Texture of Rolled Tantalum and Tantalum-10 Wt. % Tungsten." (hereinafter "Wright et al."). The Examiner relies on Kulkarni et al. in the same manner as in the above §103 rejection. The Examiner acknowledges that Kulkarni et al. does not discuss the specific texture of the target material. In an effort to overcome this deficiency, the Examiner relies on Wright et al. and asserts that Wright et al. shows a strong (100) texture. Therefore, the Examiner asserts that it would be obvious for one of ordinary skill in the art to modify Kulkarni et al. by utilizing the tantalum material as the target material. For the following reasons, this rejection is respectfully traversed.

To begin with, Wright et al. does not relate to sputter target materials and more importantly does not relate to hollow cathode target designs. Since Wright et al. does not teach or suggest the sputter quality of the plate material set forth in Wright et al., it would at best be an obvious to try standard applied by the Examiner to assert that this plate material can be used in the sputter target of Kulkarni et al. Moreover, even the combination of Kulkarni et al. with Wright et al. still does not teach or suggest the claimed invention. As indicated above, Kulkarni et al. does not teach or suggest using a non-sputtering or sputter resistant material as the top portion of the hollow cathode target design. Furthermore, Wright et al. does not teach or suggest the use of a sputter resistant or non-sputtering material as the top portion especially since Wright et al. does not even

U.S. Application No. 10/036,338
Amendment dated January 23, 2004
Reply to Office Action dated August 26, 2003

discuss targets at all. Accordingly, a combination of these two references would still not teach or suggest the claimed invention and the rejection should be withdrawn.

At page 11 of the Office Action, the Examiner then rejects claims 49-58 under 35 U.S.C. §103(a) as being unpatentable over Kulkarni et al. in view of Michaluk et al. (WO 00/31310). The Examiner relies on Kulkarni et al. in the same manner as set forth above in the §103 rejection. The Examiner does admit that Kulkarni et al. does not discuss certain grain sizes and does not describe certain mixed global textures. In an effort to overcome this deficiency, the Examiner relies on Michaluk et al. and asserts that Michaluk et al. shows tantalum metal that can be used as a sputtering target with various properties including a mixed (111) texture and the avoidance of (100) textural bands. Furthermore, the Examiner asserts that Michaluk et al. shows a variety of fine grain sizes. The Examiner believes that it would be obvious to one of ordinary skill in the art to modify Kulkarni et al. by selecting the properties of the target material as shown by Michaluk et al. because it allows for increasing the sputter efficiency of the targets. For the following reasons, this rejection is respectfully traversed.

As indicated above, Kulkarni et al. does not teach or suggest a hollow cathode target design wherein the top portion of the target design is made of a non-sputtering or sputter resistant material. Michaluk et al. does not overcome this deficiency. Accordingly, claims 49-58 which are now dependent on claim 41 would also be patentable over the cited art. Accordingly, this rejection should be withdrawn.

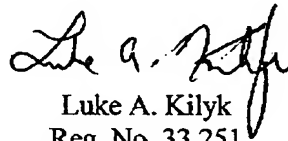
CONCLUSION

In view of the foregoing remarks, the applicant respectfully requests the reconsideration of this application and the timely allowance of the pending claims.

U.S. Application No. 10/036,338
Amendment dated January 23, 2004
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If there are any other fees due in connection with the filing of this response, please charge the fees to Deposit Account No. 03-0060. If a fee is required for an extension of time under 37 C.F.R. §1.136 not accounted for above, such extension is requested and should also be charged to said Deposit Account.

Respectfully submitted,


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